As discussed in Section 2.3.5.2.1, USARAK will not conduct live-fire training exercises with 120-mm mortar and 105-mm howitzer HE rounds while beluga whales are in Eagle River. Thus, no additional weapons- or munitions-specific buffers have been developed at this time.

In conducting comprehensive analysis of all potential causes for impact, USAG FRA also considered the potential for shrapnel from a munitions detonation to affect belugas. The best available data on the blast radii relevant weapons systems is collected in Table 2-6, below. Because the shrapnel-related impacts of a detonation are confined to a relatively small space as compared to concurrent noise-related impacts, additional protections based on blast radii were not deemed necessary.

Table 2-6. Crater Size and Blast Radius for HE Rounds by Weapon System

Weapon System	Crater Size (meters)	Blast Radius (meters)
60-mm Mortar	1.28	30
81-mm Mortar	1.76	40
105-mm Howitzer	2.34	35
120-mm Mortar	2.69	75

To further ensure the accuracy of its noise impacts analyses, USAG FRA will continue to study the effects of live-fire weapons noise on the Cook Inlet beluga whale. As more data are gathered, it may be possible to fine-tune the buffers discussed above, pending further consultation with NMFS.

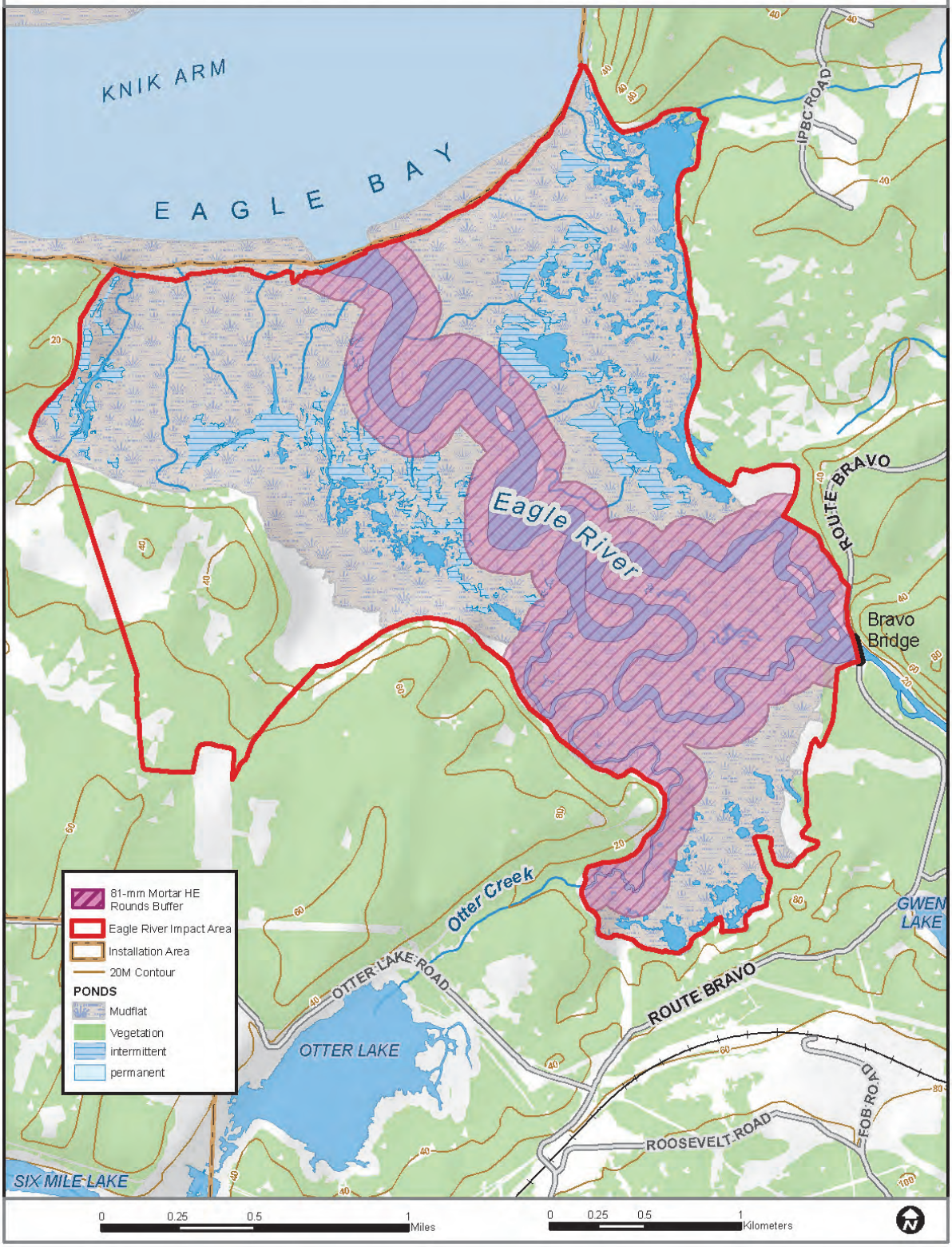
2.3.5.2 Temporal Restrictions on Live-Fire Weapons Training

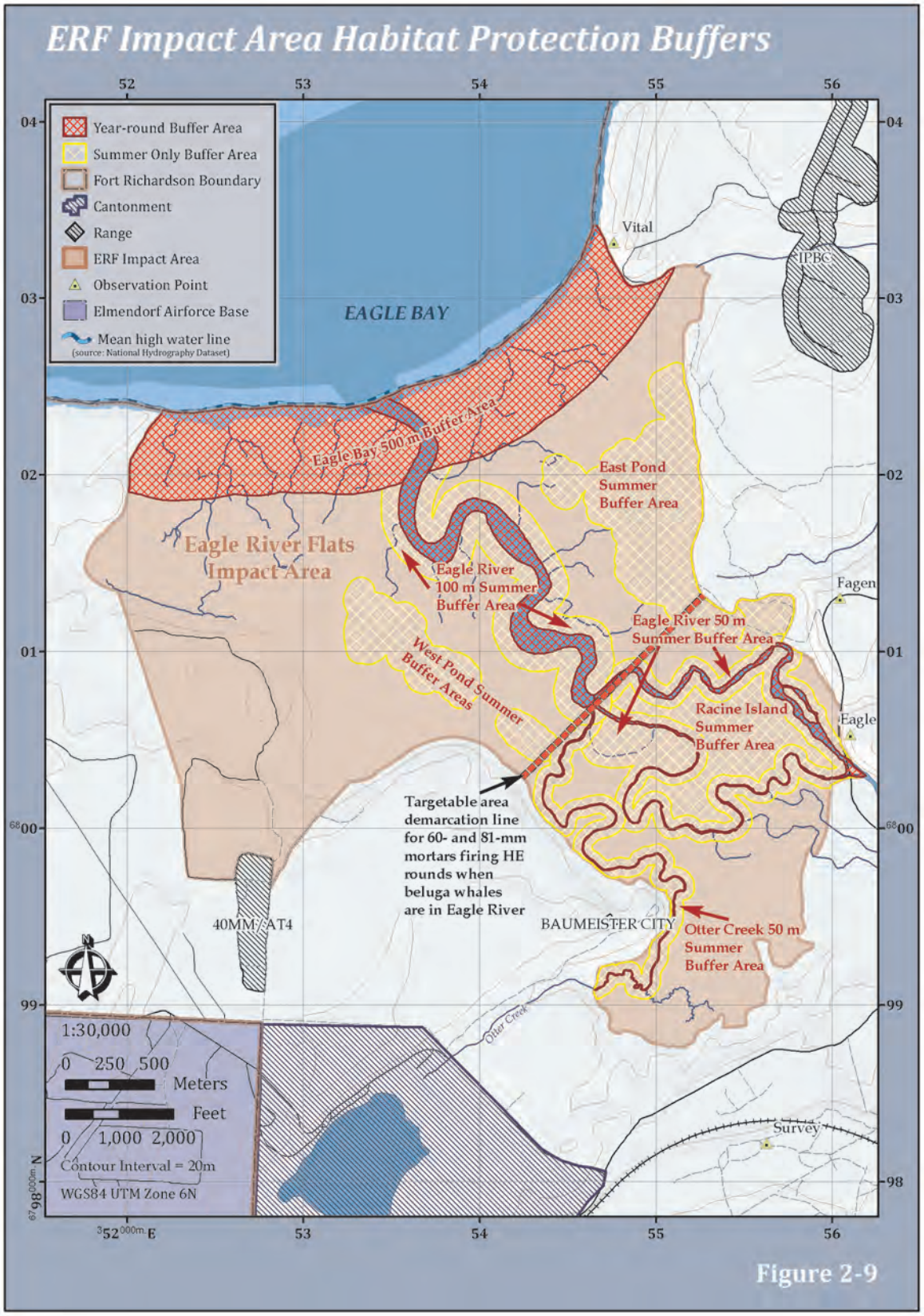
The following sections detail existing and proposed temporal restrictions on live-fire weapons training at ERF Impact Area. Temporal restrictions are effective when whales are in Eagle River as well as during waterfowl migration periods.

2.3.5.2.1 Restrictions When Whales are in Eagle River

Under the proposed action, firing of HE munitions with 105-mm howitzers and 120-mm mortars will be temporarily suspended in the event beluga whales are spotted in Eagle River, as will firing of HE munitions with 81-mm and 60-mm mortars at all targets on the bay side of the target area demarcation line running roughly southwest to northeast through the confluence of Otter Creek and Eagle River, as shown in Figure 2-9. Target areas on the inland side of this demarcation line could be used for firing of HE munitions with 81-mm and 60-mm mortars even while whales are in Eagle River, as the distance of available targets from the river, combined with the limited range of these munitions, would prevent adverse effects on belugas. All firing may resume once the whales leave the river. Live-fire training exercises with all weapon systems using non-HE rounds (FRTR, smoke, ILLUM) may be conducted when beluga whales are present in Eagle River. These restrictions will limit the potential noise exposure for belugas. A more detailed discussion of the potential effects of the proposed action is presented in Section 5.

Figure 2-8. Spatial Restrictions Along Eagle River for 81-mm Mortar HE Rounds




ERF Impact Area Habitat Protection Buffers
Year-round Buffer Area
Summer Only Buffer Area
Fort Richardson Boundary
Cantonment
Range
ERF Impact Area
Observation Point
Elmendorf Airforce Base
Mean high water line
(source: National Hydrography Dataset)
EAGLE BAY
Vital
IPBC
Eagle Bay 500 m Buffer Area
East Pond Summer Buffer Area
Eagle River Flats Impact Area
Eagle River 100 m Summer Buffer Area
Eagle River 50 m Summer Buffer Area
West Pond Summer Buffer Areas
Racine Island Summer Buffer Area
Fagen
Eagle
Targetable area demarcation line for 60- and 81-mm mortars firing HE rounds when beluga whales are in Eagle River
40MM/AT4
BAUMEISTER CITY
Otter Creek 50 m Summer Buffer Area
Otter Creek
Survey
1:30,000
0 250 500
Meters
Feet
0 1,000 2,000
Contour Interval = 20m
WGS84 UTM Zone 6N
52 53 54 55 56
04 03 02 01 00 99 98
Figure 2-9

2.3.5.2.2 Restrictions During Waterfowl Migration Periods

Under the proposed action, USAG FRA will apply restrictions on the use of ERF Impact Area during waterfowl migration periods. Presently, as stated in the 2007-2011 INRMP, all firing is prohibited during fall migration periods, and the firing of HE munitions using proximity fuzes is prohibited during spring migration periods. The proposed action would modify these restriction by permitting the firing of practice training rounds during both spring and fall migration periods. To reiterate, live-fire training with HE munitions will not be conducted during either of the waterfowl migration periods, training with other munitions would be allowed during these times. The exact beginning and ending of the migration periods will be determined by USAG FRA wildlife biologists (utilizing USFWS approved protocols) in coordination with the USFWS) each year. Spring migration is generally mid-April to mid-May and fall migration is generally August to late October.

While these restrictions were originally created to protect migratory birds, the peak migratory bird period during the fall corresponds with the heaviest usage of Eagle River by beluga whales. Figure 2-10 shows the monthly average number of belugas observed in Eagle River and Eagle Bay during the 2007 and 2008 field seasons compared to the monthly average number of waterfowl (ducks, geese and swans) on ERF for the same years (Marks and Eldridge 2008 and 2009). It is apparent that continuing to prohibit live-firing with HE munitions during the fall waterfowl migration will help minimize potential impacts to belugas. Data was not available for beluga whales in April or waterfowl in November.

Figure 2-10. 2007 and 2008 Timing of Beluga Sightings vs. Waterfowl Migration in ERF

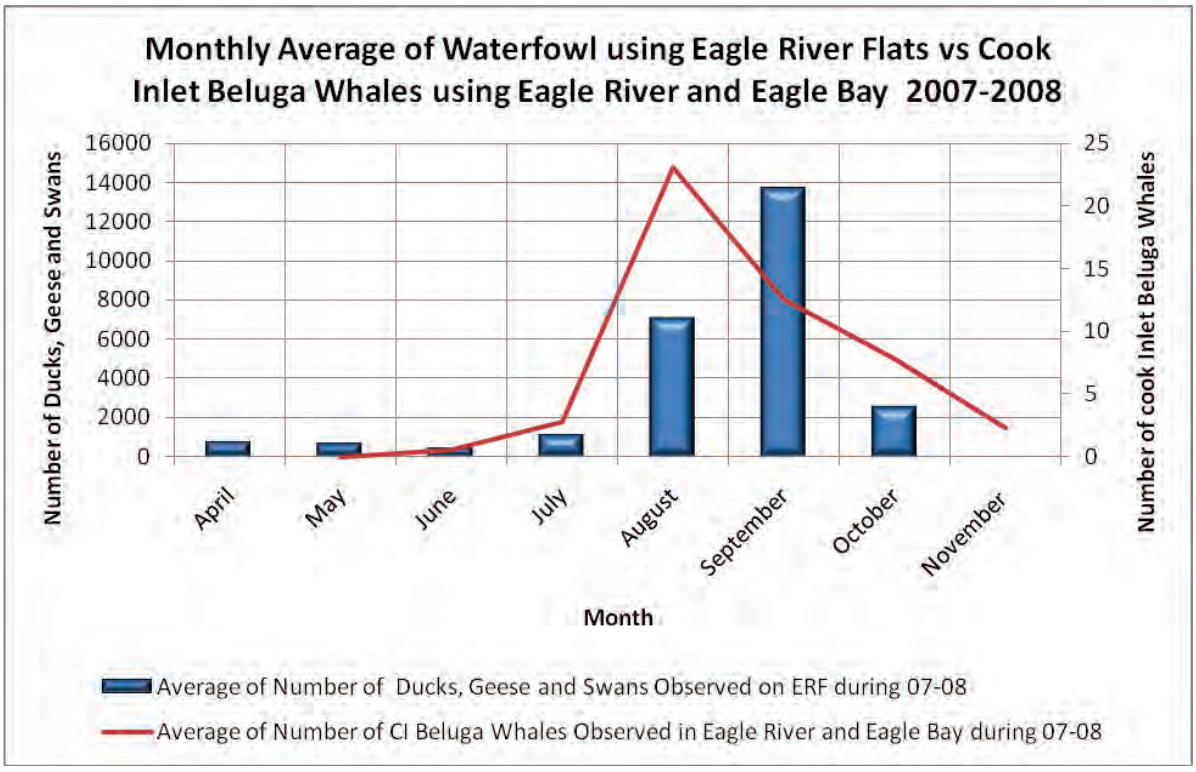


Table 2-7 summarizes the weapons systems that can be fired under different conditions into ERF Impact Area.

Table 2-7. Weapon Systems That Can Be Fired Under a Variety of Conditions

Weapons System	Type of Round	Belugas Present in Bay	Belugas Present in River	During Waterfowl Migration
60mm Mortar	HE	Permitted	Firing at select targets / target areas* permitted	No firing
	Other	Permitted	Permitted	Permitted
81mm Mortar	HE	Permitted	Firing at select targets / target areas* permitted	No firing
	Other	Permitted	Permitted	Permitted
105mm Howitzer	HE	Could be permitted pursuant to take authorizations	No firing	No firing
	Other	Permitted	Permitted	Permitted
120mm Mortar	HE	Could be permitted pursuant to take authorizations	No firing	No firing
	Other	Permitted	Permitted	Permitted

* Target areas available for use while beluga whales are in Eagle River are shown in Figure 2-9.

2.4 Conservation Measures Associated with the Action

The conservation measures described below are currently in place through existing natural resource management plans, Army Regulations, or NEPA documentation.

The 2007-2011 USAG Alaska INRMP put into place policies, programs, procedures and projects that will provide a benefit to marine mammal species occurring on or directly adjacent to USAG FRA waters and lands. The 2007-2011 INRMP also states explicitly or incorporates by reference controls on military training in USARAK Regulation 350-2 (*Regulation 350-2, Training, United States Army Alaska Range Regulation*, USARAK 2002). USARAK Regulation 350-2 provides procedures for planning, requesting, and operating ranges and training areas within USAG FRA lands. It mandates specific safety policies for conducting of live-fire as required by Department of the Army (DA) regulations. This regulation applies to all military units, organizations, and authorized individuals and agencies that use ranges and training areas at Fort Richardson. Both of these documents will be updated to include any additional mitigation measures developed during ESA consultation or the EIS process related to the resumption of year-round live-fire training on Fort Richardson.

2007-2011 INRMP marine mammal conservation and management goals include:

- Minimize impacts to marine mammal species from military training
- Minimize impacts to marine mammals from recreational use
- Minimize impacts to marine mammal habitat
- Protect and enhance marine mammal food sources and associated habitat
- Monitor occurrence of marine mammals on USAG FRA controlled waters and lands
- Evaluate the impacts of the resumption of year-round firing into ERF Impact Area on marine mammal species

- See designation of Eagle Bay and portions of Eagle River as "Restricted" areas, thus prohibiting unauthorized navigation through these waters. While the purpose of this designation is to protect the public from the inherent dangers of the ERF Impact Area, this restriction would also protect Cook Inlet beluga whales using these areas from human disturbance.

Marine mammal conservation and management goals and the measures taken to meet those goals are listed in Table 2-8.

Table 2-8. Marine Mammal Conservation Measures

Goal	Conservation Measure	Authority
Minimize impacts to marine mammal species from military training	Live-fire activities may never intentionally target wildlife.	Federal and State Law reflected in USARAK Regulation 350-2
	Harassment of fish and wildlife is prohibited. Any action that disturbs fish and wildlife is considered harassment by federal and Alaska State law. Harassment includes such things as pursuit with vehicles or aircraft, feeding, and shooting of wildlife. Vehicles, watercraft and aircraft, including helicopters, may not be used to herd/chase wildlife off the ranges or training areas. Individuals who harass fish and wildlife are subject to prosecution.	Federal and State Law reflected in USARAK Regulation 350-2
	USARAK units will not fire munitions outside military reservation boundaries (Army Policy and USARAK Regulation 350-2). Surface Danger Zones may not extend beyond military reservation boundaries.	USARAK Regulation 350-2
	Dedicated impact areas (i.e. ERF Impact Area) are permanently off limits to maneuver training and all recreation.	USARAK Regulation 350-2
	USARAK units will not intentionally fire into Eagle River at any time or within specified habitat protection buffers around Eagle River when belugas are present in the river. The habitat protection buffers are defined for each weapon system and munitions type.	2007-2011 INRMP
	USARAK units will not fire into a specified habitat protection buffer along the Eagle Bay shoreline in ERF Impact Area, the size of which is based on habitat protection goals.	2007-2011 INRMP
	USAG FRA will place all new targets outside of the defined habitat protection buffers and will cease using any old targets within those areas.	2007-2011 INRMP
	USARAK units will not fire HE munitions into ERF Impact Area during the peak waterfowl migration periods in the spring and fall. While this prohibition is primarily enacted to protect migratory birds, the timing of the migratory period coincides with peak beluga activity in Eagle River.	2007-2011 INRMP
	Observers will be present prior to and during training exercises to ensure that marine mammals are not present where they could be harassed or harmed due to training activities.	2007-2011 INRMP
	USAG FRA will design its proposed action to avoid take to the extent practicable, and will not engage in activities likely to cause take without authorization under the MMPA and ESA.	ESA, MMPA 2007-2011 INRMP
Minimize impacts to	Explosive munitions impact areas (i.e. ERF Impact Area) are permanently off limits to recreational use.	USARAK Regulation 350-2

Goal	Conservation Measure	Authority
marine mammals from recreational use	USAG FRA will not provide recreational access to Knik Arm and Eagle Bay from Fort Richardson.	2007-2011 INRMP
	USAG FRA prohibits rafting access to ERF Impact Area. The take out point for Eagle River rafters is 4 kilometers upstream from the mouth of the river approximately 100 meters upstream of Route Bravo Bridge. The Army is also currently proposing restrictions to access through a portion of Eagle Bay and Eagle River.	USARAK Regulation 350-2
Minimize impacts to marine mammal habitat	USARAK units will not intentionally fire direct or indirect-fire weapons into Eagle River at any time.	USARAK Regulation 350-2
	There will be no firing across or into navigable waters not listed in the Federal Register as a "Restricted Area".	USARAK Regulation 350-2
	Munitions containing phosphorus will not be fired into wetlands.	USARAK Regulation 350-2
	USAG FRA will continue water quality monitoring in Eagle River and Eagle Bay.	2004 Settlement Agreement
	Eagle River will remain unobstructed to normal passage of beluga whales through the entirety of ERF. Army activities will not cause any impedance to either ingress or egress of beluga whales along the stretch of Eagle River from Bravo Bridge downstream to the mouth at Eagle Bay.	2007-2011 INRMP
Protect and Enhance Marine Mammal Food Sources and Associated Habitat	No tracked or wheeled maneuvering is permitted within a 50-meter buffer around all streams, lakes, and any open, flowing water located on USAG FRA lands during the summer unless crossing at a 90-degree angle to the stream. Fish spawning streams will not be crossed during summer. All appropriate state and federal permits will be obtained prior to any in-water activities occurring in anadromous waterways.	USARAK Regulation 350-2
	Stream bank restoration and erosion control projects will be conducted on North and South Post Fort Richardson as detailed in the 2007-2011 INRMP.	2007-2011 INRMP
Monitor occurrence of marine mammals on USAG FRA controlled waters and lands	Continue to work cooperatively with NMFS to monitor beluga whales in Eagle Bay and Knik Arm. Monitoring will continue to be refined to improve the ability to detect belugas.	2007-2011 INRMP
	Conduct weekly monitoring during the summer to identify the presence and abundance of beluga whales in Eagle River.	2007-2011 INRMP
	Verify the presence or absence of beluga whales in Eagle River prior to firing to determine applicable firing restrictions.	2007-2011 INRMP

3.0 Description of Species and Habitat

In consultation with NMFS, it has been determined that the Cook Inlet beluga whale is the only species listed under the ESA that is found within the action area. It should be noted that during the fall of 2009 a lone Stellar sea lion was observed in transit near the action area. This was an extremely rare occurrence; neither USAG FRA nor NMFS are aware of any other Steller sea lion sightings in this vicinity. During informal consultation, USAG FRA and NMFS agreed that there is very little likelihood of a Steller sea lion entering the action area in the future. Therefore, no species other than the beluga whale will be discussed in this BA.

At present, no Critical Habitat has been designated for the Cook Inlet beluga whale. A proposed rule for designation of Critical Habitat for the Cook Inlet beluga whale under the ESA was published in the Federal Register on 2 December, 2009. No final rule has been issued to date. Because Critical Habitat has not been formally designated for the Cook Inlet beluga whale, it is not possible for this BA to address such a designation specifically. However, the analysis in this BA does demonstrate that the proposed action would not cause any adverse impacts on Cook Inlet beluga whale habitat generally. Thus, adverse impacts to any Critical Habitat, if and when designated, are not expected.

Beluga whales are circumpolar in distribution and occur in seasonally ice-covered arctic and subarctic waters. Belugas occur along the coast of Alaska, except the Southeast panhandle region and the Aleutian Islands. Five distinct stocks are currently recognized in Alaska: Beaufort Sea, eastern Chukchi Sea, eastern Bering Sea, Bristol Bay, and Cook Inlet (Angliss and Outlaw 2005). Of these, the Cook Inlet stock is the most isolated in Alaska, based on the degree of genetic differentiation between this stock and the four other stocks (O'Corry-Crowe *et al*. 1997). This stock is also the smallest in terms of estimated quantity.

3.1 Cook Inlet Beluga Whale

The range of Cook Inlet belugas has been defined as the waters of the Gulf of Alaska north of 58° N and freshwater tributaries to these waters, based on available scientific data in 2000 (65 FR 34590, 31 May 2000; MMPA Sec. 216.15(g)). Few beluga sightings occur in the Gulf of Alaska outside Cook Inlet. Laidre *et al.* (2000) summarized available information on prehistoric to current distribution of belugas in the Gulf of Alaska, and, with the exception of Yakutat, sightings have been rare and sporadic given the extent of the survey efforts. Of 169,550 cetacean sightings recorded in the Gulf of Alaska prior to the year 2001, excluding Cook Inlet, only 44 were beluga (Laidre *et al.* 2000), indicating they are extremely rare in the Gulf of Alaska outside Cook Inlet. Calkins (1989) described belugas in Cook Inlet, Prince William Sound, Yakutat Bay, and throughout the coastal waters of the Gulf of Alaska, from the northern portions of Kodiak Island to Yakutat.

3.1.1 Description and Taxonomy

Beluga whales, members of the family Monodontidae, are small, toothed whales that are white in color as adults. Beluga calves are born dark to brownish gray and lighten to white or yellow-white with age. Adult Cook Inlet beluga whales average between 12 and 14 feet in length, although native hunters have reported some may reach as much as 20 feet (Huntington 2000). Adult beluga males may weigh up to 3,300 pounds while females are typically smaller, weighing up to 3,000 pounds (Nowak 2003). The cervical vertebrae in belugas are not fused, allowing them to turn and nod their heads. Instead of a dorsal fin, belugas have a tough dorsal ridge. They also exhibit a relatively small head, fluke, and flippers.

3.1.2 Biology and Behavior

Beluga whales typically give birth to a single calf every two to three years, after a gestation period of approximately 14 months. Most of the calving in Cook Inlet is assumed to occur from mid-May to mid-July, although Native hunters have observed calving from April through August (Huntington 2000). Young belugas are nursed for two years and may continue to associate with their mothers for a considerable time thereafter (Reeves *et al.* 2002).

Belugas calves are dark brown or blue-gray, and become lighter in color as they reach adulthood. Sexual maturity can vary from 4 to 10 years for females and 8 to 15 years for males. It is believed that beluga whales may live more than 30 years, although recent discoveries pertaining to ageing techniques may lead scientists to effectively double these estimates. Historically, it was believed that beluga whales deposited two growth layer groups in their teeth per year. Recent studies, however, state that only one layer is deposited per year (NMFS 2008).

Beluga whales normally swim about 2 to 6 miles per hour, but when pursued, can attain a speed of 14 miles per hour. While they usually surface to breathe every 30 to 40 seconds, radio-tracking studies show that they also routinely dive for periods of 9.3 to 13.7 minutes and to depths of 66 to 1,140 feet, presumably for feeding (Nowak 2003).

Beluga whales have a well-developed sense of hearing and echolocation. Most sound reception takes place through the lower jaw, which is hollow at its base and filled with fatty oil. Sounds are conducted through the lower jaw to the middle and inner ears, then to the brain. Belugas can hear over a large range of frequencies, from about 40 Hz to 150 kilohertz (kHz) (Au 1993; Johnson 1967; Johnson *et al*. 1989; Scheifele 1987; White *et al*. 1978). Their most acute hearing occurs at frequencies between about 9 kHz and 90 kHz. Beluga whales conduct communication and echolocation at relatively high frequencies where they have a lower hearing threshold and greater hearing sensitivity. Studies have shown belugas to emit communication calls with an average frequency range from about 2.0 to 5.9 kHz. Echolocation is generally conducted at frequencies greater than 40 kHz. Studies have shown that belugas generally produce signals with peak frequencies of 40 to 120 kHz during echolocation, and the intensity of the signal can change with location and background noise levels. Echolocation is presumably used to avoid obstacles and to search for prey (Nowak 2003).

Belugas are known to produce a variety of sounds. Vocalizations can be heard above water and include low liquid trills, whistles, and clicks. Because of their loquacious nature, beluga whales are sometimes called sea canaries (Nowak 2003).

Belugas are extremely social animals that typically interact together in close, dense groups. Groups of 10 to more than 100 whales have been observed in Cook Inlet. It is unknown whether these represent distinct social divisions (NMFS 2008) although Reeves *et al.* (2002) mentioned the groups are often of the same sex and age class. Traditional knowledge also suggests that belugas maintain family groups (Huntington 2000).

3.1.3 Population Abundance and Trend

According to NMFS (2008), the Cook Inlet population of beluga whales has probably always numbered fewer than several thousand animals, but in recent years has declined significantly from its historical abundance. It is difficult, however, to accurately determine the magnitude of decline due to the paucity of information on the beluga whale population that existed in Cook Inlet prior to development of the region, or prior to modern subsistence whaling by Alaska Natives. With no reliable abundance surveys conducted prior to the 1990s, scientists must estimate historical abundance based on what little data exist. Relying on a survey conducted in portions of Cook Inlet

during 1979, Calkins (1989) estimated a population of 1,293 beluga whales. This overall abundance estimate provided by Calkins represents the best available information on historical abundance.

Comprehensive, systematic aerial surveys of beluga whales in Cook Inlet began in 1993 with the goal of determining the overall abundance and population trend for the species. A decline in abundance of around 47 percent, from an estimate of 653 whales to 347 whales, was documented between 1994 and 1998 (Hobbs *et al.* 2000). After measures were established in 1999 to regulate subsistence harvests, NMFS expected that the population would grow at a rate between 2 and 6 percent. Abundance estimates from aerial surveys (1999-2008) indicate this level of growth did not occur. Looking at the population estimates since the regulation of subsistence harvests (1999-2008) NMFS (2008) has documented a population decline of 1.5 percent per year. Based on 2008 aerial surveys, NMFS calculated an overall abundance estimate of 375 whales for the Cook Inlet population. The 2009 population abundance estimate was 321 whales. A precise comprehensive statistical assessment of population trend is not possible given differences in survey methods and analytical techniques prior to 1994. A straight comparison of the 1,293 beluga estimate from 1979 to the 375 belugas estimated for 2008 would indicate a 71 percent decline in 30 years, but with unspecified confidence.

Within Knik Arm, beluga abundance is highly variable. Fourteen years of aerial surveys conducted during the first weeks of June by NMFS show beluga abundance ranging from 224 to 0 whales (NMFS 2008). Surveys conducted by boat in 2004 reported variable abundance counts in Knik Arm for August through October; 5-130 whales in August, 0-70 whales in September, and 0-105 whales in October (Funk *et al*. 2005).

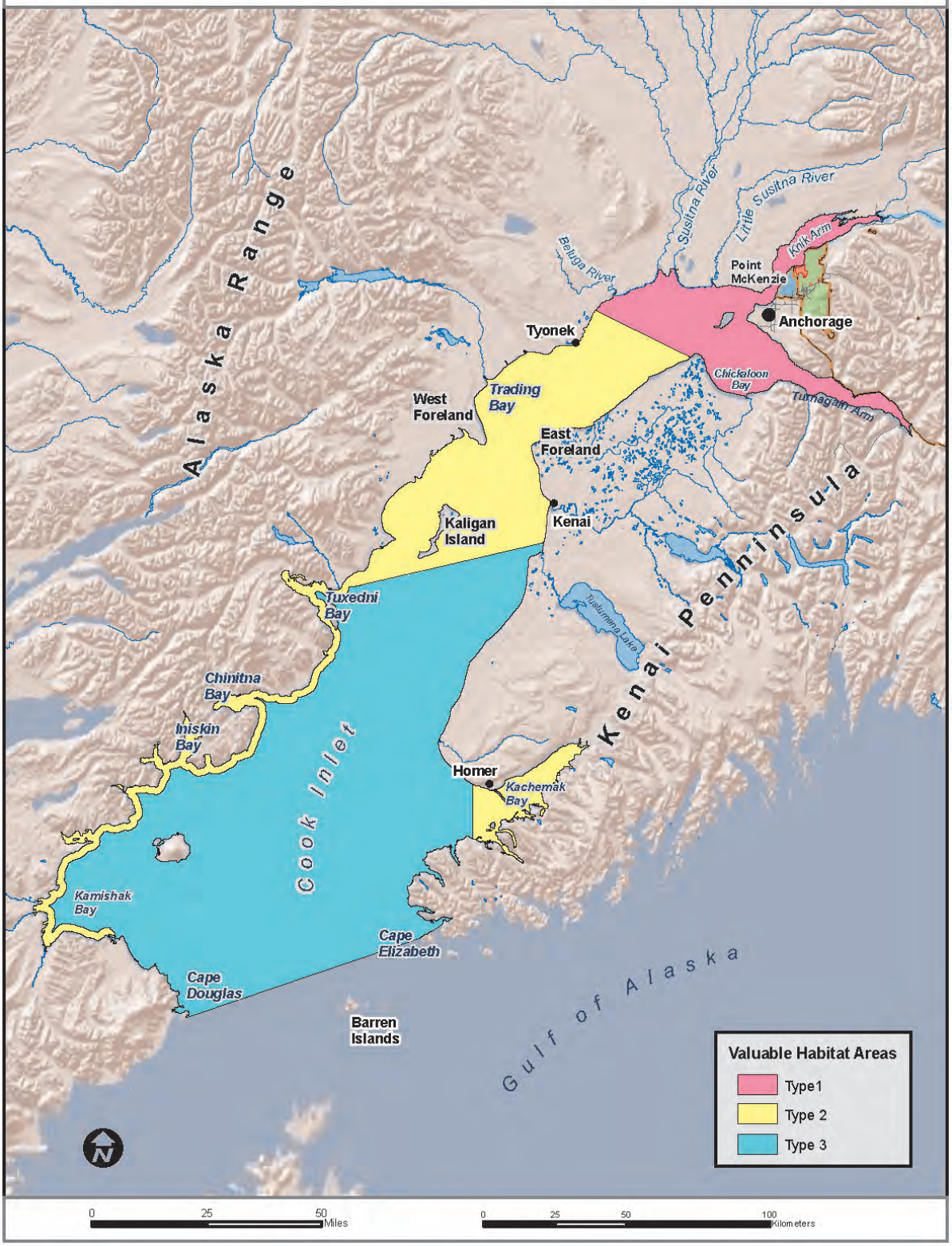
3.2 Cook Inlet Beluga Whale HabitatBeluga whales generally occur in shallow, coastal waters, often in water barely deep enough to cover their bodies (Ridgway and Harrison 1981). While it is difficult to quantify the importance of various habitats in terms of the health, survival, and recovery of the Cook Inlet beluga whale, NMFS believes certain areas are particularly important. As part of their conservation strategy detailed in the 2008 Conservation Plan, NMFS assigned relative values to habitats in Cook Inlet based on beluga whale usage (NMFS 2008). Three "valuable habitat" types were stratified and characterized as follows (Figure 3-1):

(1) Type 1 Habitat – This habitat region encompasses all of upper Cook Inlet northeast of a line three miles southwest of the Beluga River across to Point Possession. Type 1 habitat is considered the most valuable due to the high concentrations of beluga whales, which use these areas from spring through fall for foraging and nursery habitat. This region is characterized by shallow tidal flats, river mouths, and estuarine areas. Type 1 habitat also has the greatest potential for anthropogenic impacts to the Cook Inlet beluga whale population.

(2) Type 2 Habitat – This habitat region is located south of Type 1 habitat and north of line at 60.2500 north latitude. It also follows the tidal flats south along the west side of the Inlet into Kamishak Bay and down to Douglas Reef, and includes an isolated section of Kachemak Bay. Type 2 habitat includes areas with known high fall and winter use, as well as some areas of less concentrated spring and summer use.

(3) Type 3 Habitat – This habitat region encompasses the remaining portions of Cook Inlet south of 60.2500 north latitude to a southern boundary stretching from Cape Douglas to Elizabeth Island. This region includes the areas of known historical usage by beluga whales.

Figure 3-1: Valuable Habitat Areas Identified for Cook Inlet Beluga Whales



The upper Cook Inlet, including all marine waters within the action area of this Biological Assessment, is designated "Type 1" habitat, a designation indicating the most valuable habitat type for Cook Inlet beluga whales.

Knik Arm, which contains Eagle Bay, represents the northernmost extension of upper Cook Inlet. Knik Arm is approximately 31 miles long by 5 miles wide and varies in depth from over 160 feet at mean lower low water (MLLW) in the southernmost aspect of the arm to 0 feet (MLLW) in the extreme upper reaches (exposed mud flats). Tides in Knik Arm are semi-diurnal (two high and low tide events per lunar day[7]) with a maximum tidal range (difference between high and low water events) approaching 40 feet. Tidal velocities vary greatly depending on location in Knik Arm but often exceed seven knots during the ebb-tide with flooding velocities measuring somewhat less (Smith 2004). Strong horizontal and vertical current shears exist throughout the arm most likely combining with the strong tidal flux to create a well mixed water column with vertically uniform temperatures (7°- 8° C) and brackish salinities (4-8 Practical Salinity Units)[8] (Smith et al. 2005) .

The arm receives the majority of its freshwater from eight rivers and streams (Ship Creek, Eagle River, Peters Creek, Eklutna River, Knik River, Matanuska River, Little Susitna River and Chester Creek) with the glacial Knik and Matanuska rivers contributing by far the most suspended sediment (summarized in Smith 2004). This suspended sediment, combined with glacial till eroding from high bluffs lining the arm, as well as sediment resuspended by turbulent conditions, contribute greatly to the high prevailing turbidity of the water in Knik Arm. The upper Arm generally exhibits the greatest sediment loads with a mean turbidity of 629 nephelometric turbidity units (measured between April and July in Eagle Bay) (Pentac Environmental 2005).

3.2.1 Proposed Critical Habitat designation for the CI beluga under the ESA

On 2 Dec, 2009 the NMFS published a proposed rule for Critical Habitat (CH) designation for the Cook Inlet beluga whale distinct population segment under the ESA .The proposed CH includes two geographic areas of marine habitat in Cook Inlet comprising 7,809 square kilometers (74 Federal Register [FR] 230) and are bounded by Mean Higher High Water (MHHW) datum on the upland. Also included in the proposed designation are the the lower reaches of the Susitna River, the Little Susitna River, the Chickaloon River and the Kenai River . Other tidally influenced tributaries of Cook Inlet are not included in the proposal.

The proposed Area 1 comprises 1,918 square kilometers of marine habitat in Cook Inlet extending northeast of a line drawn from a point at the mouth of Threemile Creek (61° 08.5□ N, 151° 04.4□ W) to a point at Point Possession (61° 02.1□ N, 150° 24.3□ W). Also included are waters of the Susitna River south of latitude 61° 20.0□ N, the Little Susitna River south of latitude 61° 18.0□ N and the Chickaloon River north of latitude 60° 53.0□ N.

The proposed Area 2 comprises 5891 square kilometers of Cook Inlet marine waters south of a line drawn from a point at the mouth of Threemile Creek (61° 08.5□ N, 151° 04.4□ W) to a point at Point Possession (61° 02.1□ N, 150° 24.3□ W). Also included in area 2 are waters within two nautical miles seaward of MHHW along the western shoreline of Cook Inlet between latitude 61° 25□ N and the mouth of the Douglas River (59° 04□ N, 153° 46.0□ W), all waters of Kachemak Bay east of longitude 151 40.0□ W and the waters of the Kenai river downstream of the Warren Ames bridge in the city of Kenai.

[7] One lunar day = 24.8 hrs

[8] Temperatures and salinities were taken in July and August near the Cairn Point

Included in the proposed ruling is a proposed exclusion from CH designation under ESA 4(a)(3)(B)(i) of the Eagle River Flats, including the lower reaches of Eagle River, based on an analysis of the USAG FRA Integrated Natural Resources Management Plan (INRMP). The NMFS concluded that the INRMP provides benefit for the CI beluga consistent with section 4(a)(3)(B)(i) of the ESA and therefore proposed exclusion from CH designation of areas within ERF.

The proposed ruling also includes designation of five environmental attributes that are deemed essential to the conservation of the CI beluga whale. These attributes, or primary constituent elements, are:

1) Shallow intertidal and subtidal waters of Cook Inlet (depths <30 feet at MLLW) that are within 5 miles of high and medium flow anadromous fish streams.

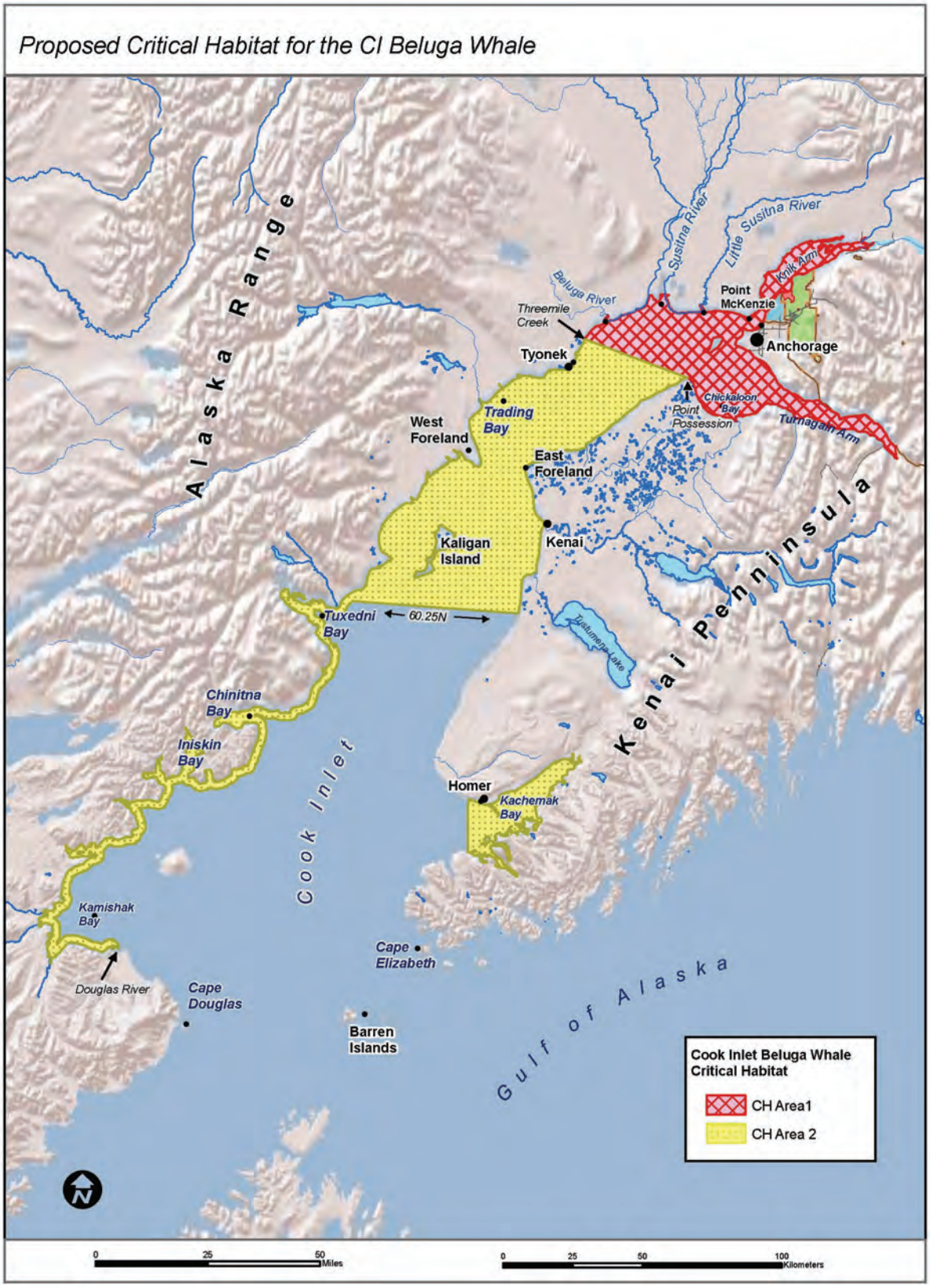
2) Fish species deemed to be the primary prey species of the CI beluga including Chinook salmon, sockeye salmon, chum salmon, coho salmon, Pacific eulachon, Pacific cod, walleye Pollock, saffron cod, and yellowfin sole.

3) The absence of toxins or other agents of a type or amount harmful to beluga whales.

4) Unrestricted passage within or between critical habitat

5) The absence of in-water noise at levels resulting in the abandonment of habitat by CI beluga whales.

Figure3-2. Proposed Critical Habitat for the Cook Inlet beluga whale



3.2.2 Distribution and Habitat Preferences

3.2.2.1 Distribution

Little information is available on the distribution of beluga whales in Cook Inlet prior to 1970; however, in the 1970s and 1980s, beluga sightings occurred across much of mid and upper Cook Inlet (Calkins 1984). For instance, sightings in the Kenai River area were common, and beluga concentrations were reported in Trading Bay and Kachemak Bay (Calkins 1984). Systematic aerial surveys have been conducted by NMFS during summer months since 1993. These surveys show that in the 1990s the summer distribution diminished to only the northernmost portions of Cook Inlet (Rugh *et al.* 2000).

To identify current Cook Inlet beluga habitat use, particularly in winter, NMFS researchers conducted a satellite tracking project from 1999 through 2003 (AFSC 2009). Satellite positioning tags were placed on 18 beluga whales between 1999 and 2002. All tagged whales remained in Cook Inlet during the observation periods indicating that belugas occupy Cook Inlet year round and do not engage in the seasonal migrations exhibited by northern beluga populations. The majority of the activity recorded during these tracking studies occurred in Upper Cook Inlet, north of the Forelands, with occasional use of areas as far south as Chinitna Bay.

In the Knik Arm of Cook Inlet, beluga whales generally are observed arriving in May and often using the area all summer, feeding on various salmon runs and moving with the tides. There is more intensive use of Knik Arm in August and through the fall, coinciding with the coho run. Beluga whales often gather in Eagle Bay between the months of May and November (Hobbs *et al*. 2005) and have been observed in Eagle River from June to November as far inland as 1¼ miles upstream (CH2M Hill 1997). The whales gather elsewhere on the east side of Knik Arm and sometimes in Goose Bay (about 4 miles from ERF Impact Area) on the west side of Knik Arm. They often retreat to the lower portion of Knik Arm during low tides (NMFS 2008).

3.2.2.3 Feeding Habitat

According to NMFS (2008), beluga whales in Cook Inlet often aggregate near the mouths of rivers and streams where salmon runs occur during summer and fall. Their winter distribution does not appear to be associated with river mouths, as it is during the warmer months, but instead with the deeper waters in mid Inlet. Fish surveys in Knik Arm have identified the presence of adult and juvenile salmonids, 3 and 9-spine stickleback and saffron cod among other species (Pentec Environmental 2005). These studies suggest the following list of prey items for belugas in the Knik Arm:

April – eulachon, saffron cod

May – eulachon, Chinook salmon, saffron cod

June – Chinook salmon, saffron cod (questionable)

July – Pink, chum, sockeye and coho salmon

August – coho salmon, saffron cod

September – saffron cod, longfin smelt

October – saffron cod, longfin smelt

November – saffron cod

The stomach contents of 21 Cook Inlet belugas harvested or stranded in Cook Inlet between 1995 and 2007 found the following species (Hobbs *et al*. 2008):

April – invertebrates [polychaetes, shrimp (*Crangon franisconrum*) and crab (*Chionoecetes bairdi*)], saffron cod, Pacific cod, walleye pollock, eulachon, and salmon species

May – Pacific cod and salmon species

June – no prey items identified

July – invertebrate species, coho salmon and salmon species

August – longnose sucker, yellowfin sole, chum salmon, coho salmon and salmon species

September – saffron cod, cod species, coho salmon and salmon species

October – invertebrate species, Pacific staghorn sculpin, saffron cod, walleye pollock, cod species, yellowfin sole, starry flounder, chum salmon and salmon species

November – no prey items identified

USAG FRA personnel sampling the tidally influenced portions of Eagle River and its tributaries within ERF, in 2007 and 2008 collected 3-spine stickleback, 9-spine stickleback, saffron cod, starry flounder, snailfish spp, rainbow smelt, eulachon, Dolly Varden, juvenile salmon (Chinook, coho, sockeye), and sand shrimp.

Salmon escapement numbers and commercial harvest have fluctuated widely throughout the last 40 years and there is no clear correlation between salmon runs and beluga whale population numbers. Dense concentrations of prey appear essential to beluga whale feeding behavior, but the relationship between beluga whale concentrations and salmon concentrations is not fully known (NMFS 2008). Because beluga whales do not always feed at the streams with the highest runs of fish, water depth and fish density may be more important than sheer numbers of fish in their feeding success (NMFS 2008). The channels and shallow water at some river mouths may concentrate salmon and funnel them past waiting beluga whales.

3.2.2.4 Breeding and Calving Habitat

Very little is known about beluga whale breeding behavior, and it is difficult to identify beluga breeding habitat with any certainty. It is thought that the shallow waters of the upper Inlet may provide important calving and nursery areas (NMFS 2008). The shallow tidal flats provide warmer water temperatures, which may benefit newborn beluga calves that lack the thick insulating blubber layer of adults. Alaska Natives described calving areas within Cook Inlet as the northern side of Kachemak Bay in April and May, off the mouths of the Beluga and Susitna River in May, and in Chickaloon Bay and Turnagain Arm during summer (Huntington 2000).

3.3 USAG FRA Beluga Whale Monitoring in Eagle Bay and Eagle River

The Army has historically taken an interest in the beluga whale and has recorded sightings over the past two decades. In recent years more intensive field surveys for beluga whales have been conducted from June through October of each year. In 2005, USAG FRA developed standard operating procedures and protocols for monitoring beluga whales in and around ERF Impact Area. In 2008 the survey methodology was modified to allow the capture of more statistically rigorous data. Section 3.3.1 details the observation protocols used from 2005-2007 and 2008-present.

3.3.1 Survey Methodology

3.3.1.1 2005-2007

Field surveys for beluga whales took place from June through October at Cole Point (training area 415) or Observation Point Fagen (training area 407) (see Figure 2-5). When whales were observed from the observation points, survey personnel requested clearance from Fort Richardson Range Control to enter the ERF Impact area. Once clearance was granted, survey personnel proceeded to a pre-cleared area overlooking the mouth of the Eagle River and commenced data collection. Information collected included date, time, observer, location, optics used, environmental conditions, bearing to whale group, number of whales, activity, grid position of group, direction of travel, and notes on other wildlife present, aircraft, or general comments on beluga behavior, etc. In addition to observations, photographic or video-graphic documentation was obtained when feasible.
While this approach did provide valuable observations on beluga presence and behavior, it did not provide a means for rigorous statistical analysis of the data collected. Thus, in 2008 the methodology was modified in an attempt to capture more statistically meaningful data.

3.3.1.2 2008-2009

Whale observations were carried out using a systematic sampling design consisting of a group follow protocol and focal group sampling method. Observers followed a group of whales over the course of a 20 minute sampling round using binoculars and/or high powered spotting scopes. Group activity was defined as what most (>50%) of a whale group is engaged in during the course of the sampling round. The various categories of whale behaviors were strictly defined prior to sampling to minimize any ambiguities and variation between observers. Whales were classified as white, gray or calf and the location of whale groups at the start and end of each sampling round is classified using a grid superimposed on a map of Eagle Bay and Eagle River.

Use of the modified sampling protocol contained several limitations that should be mentioned. The quantification of whales into color classes was always biased towards “white” animals due to easier detectability, and was heavily influenced by prevailing survey conditions (e.g. visibility, precipitation, light conditions). Calves may have been underrepresented due to difficulty in distinguishing between young and “gray” animals, especially at long distances. Because calves frequently surface in very close contact with the cow, often on the side opposite from the observer, they were sometimes difficult to observe. Group follow protocol may have also been biased towards more obvious behaviors or more visible animals. Moreover, behavioral sampling was limited to activities above the water line due to the extreme turbidity of Knik Arm. Finally, military training on nearby ranges occasionally prevented access to ERF Impact Area, thus disrupting the distribution of summer and fall observations.

Starting in 2008, USAG FRA supplemented its visual observation data by deploying remote, color, motion-sensitive cameras with infrared illumination at low light to collect presence/absence data on belugas during times when observers are not present. A minimum of two cameras were deployed on the north bank of Eagle River – one at the mouth facing SSW (perpendicular to water flow) and one approximately 200 meters upstream from the mouth (facing west). Cameras were set on time-lapse mode with a one minute time increment between shots and with the motion-detection feature also enabled. Camera times were synched with each other and all other devices used to record time during the observational period (watches, video cameras, etc). Each camera was checked for obvious external problems (alignment change, lens fouling, etc.) daily when possible, and serviced (change card and batteries) every two weeks.

USAG FRA technicians downloaded the data from the camera cards onto a dedicated external hard drive and back up on a redundant drive. Upon removal of a camera from the field, images from each

card were analyzed as soon as possible, within two weeks at maximum. Analyses were performed by either one experienced team member who has analyzed at least one full season's worth of camera data (or at least 30,000 images), or alternatively by two team members who had as individuals analyzed less than 30,000 images each. In analyzing the data, team members scrolled through a series of photos looking primarily for presence of beluga whales and harbor seals in the river. They then compiled data indicating camera number, folder name, starting time and date of the folder, presence of beluga(s) or other marine mammals, any other unusual event (e.g. boat passage, other mammalian presence, etc.), and the date and end time of each folder. Entries regarding the presence of a beluga included notations of date, time, image number, number of whales, color of whales and tidal state. Analysts also noted whether observers were present on the flats during the dates covered in a folder, and if so, during which times. All data collected was entered into a Microsoft Access database and saved on the two external drives mentioned above.

3.3.2 Results of Beluga Whale Monitoring Efforts on Fort Richardson, 1988 – 2009

Limited information is available on beluga whale monitoring efforts by USAG FRA staff from the 1980s, 1990s, and early 2000s. Table 3-1 lists incidents of beluga whale sightings recorded by USAG FRA personnel from 1988 and 1991. Personnel have maintained more complete records for beluga whale observations from 2005 to 2009.

Table 3-1. Beluga Whale Sightings In or Near ERF Impact Area in 1988 and 1991

Date	Location[1]
September 1988	Drainage slough northwest corner of Eagle River Flats
18 June 1991	Eagle Bay
26 June 1991	Knik Arm near Goose Bay
13 July 1991	Eagle Bay and mouth of Fire Creek
5 August 1991	Eagle Bay/Eagle River mouth
9 August 1991	Approximately 0.6 miles up Eagle River
20 August 1991	Knik Arm near Eagle Bay
23 August 1991	Eagle Bay (about 20-25) and approximately 1.25 miles up Eagle River
29 August 1991	Eagle Bay and approximately 0.6 miles up Eagle River
31 August 1991	1.25 miles up the Eagle River[2]
21 September 1991	Mouth of Eagle River
11 October 1991	Eagle Bay near mouth of Eagle River
21 October 1991	Approximately 0.3 miles up Eagle River
12 November 1991	Mouth of Eagle River

Source: Gossweiler 1991.
[1]All but one sighting was from either fixed wing aircraft or helicopter.
[2]Ground observation.

USAG FRA biologists conducted beluga whale monitoring surveys in and around ERF Impact Area on 10 occasions during the 2005 field season from June through October, but they did not observe whales during these surveys. Four additional aerial surveys conducted in August, September, and

October of the same year resulted in multiple beluga whale sightings in the Knik Arm adjacent to the ERF Impact Area (Clevenger 2006).

During 2006, staff conducted surveys on 19 days from May through October. Beluga whales were observed during three of these surveys, each occurring during late August and early September. A maximum of eight belugas were sighted at one time in the river itself while a maximum of 15 to 20 belugas were sighted in Eagle Bay. Observed beluga activity in Eagle River included traveling (58% of observations noted), milling (32% of observations), feeding or suspected feeding (7%) and other activities including one incident of spyhopping (coming out of the water vertically and momentarily staying out of the water) and one interaction with a harbor seal (2%). Observed beluga activity in Eagle Bay was predominantly traveling (86% of observations noted). Milling accounted for 14% of the observations. Feeding activity was suspected if fish were observed in close proximity to a whale or if an unusual amount of subsurface activity was observed. The majority of beluga activity in Eagle River occurred within the first 0.3 miles of river (river miles) upstream from Eagle Bay although two whales were observed traveling up to 0.75 miles upstream (river miles) (Garner 2007). Table 3-2 summarizes beluga observations from 2005 and 2006.

Table 3-2. Beluga Whale Sightings In or Near ERF Impact Area in 2005 and 2006

Date	Location
August 22, 2005	Adjacent to Eagle River Flats[1]
September 6, 2005	Adjacent to Eagle River Flats[1]
October 4, 2005	Adjacent to Eagle River Flats[1]
October 14, 2005	Adjacent to Eagle River Flats[1]
August 29, 2006	Eagle Bay, Mouth of Eagle River, Eagle River
August 30, 2006	Eagle River
September 7, 2006	Mouth of Eagle River

Sources: Clevenger 2006 and Garner 2007.
[1]Beluga whales were not sighted within Eagle Bay, the mouth of Eagle River, or within Eagle River.

USAG FRA also conducted beluga whale surveys in Eagle River and Eagle Bay from May through October 2007. The results are shown below in Table 3-3. Beluga whales were sighted on 43% of all observation days and the mean number of whales counted over the course of the field season was 7.5 individuals.

Table 3-3. Beluga Whale Sightings In or Near ERF Impact Area in 2007

Date	Number of Belugas	Activity	Location
15 June 2007	2	Travelling	1 mile northeast of mouth of Eagle River
16 June 2007	2	Travelling	Eagle Bay
18 July 2007	1	Feeding	Eagle River
3 August 2007	12	Milling	1 mile northeast of mouth of Eagle River
7 August 2007	30	Milling	Mouth of Eagle River

Date	Number of Belugas	Activity	Location
8 August 2007	27	Milling	Mouth of Eagle River
9 August 2007	31	Feeding	Mouth of Eagle River
10 August 2007	33	Travelling	North end of Eagle Bay
11 August 2007	20	Milling	Mouth of Eagle River
13 August 2007	35	Travelling	Moving from Eagle River into Eagle Bay
15 August 2007	15	Milling	Eagle River
17 August 2007	22	Milling	Eagle River
20 August 2007	10	Milling	Near mouth of Eagle River
21 August 2007	6	Travelling	1/2 mile southwest of Eagle River mouth
24 August 2007	26	Milling	1 mile northeast of mouth of Eagle River
27 August 2007	23	Milling	1/2 mile north of Eagle River mouth
30 August 2007	11	Travelling	Moving out of Eagle River to the south
10 September 2007	21	Milling	300 yards out from Eagle River mouth
14 September 2007	12	Milling	Near mouth of Eagle River
16 September 2007	7	Milling	1 mile north of Eagle River mouth
23 October 2007	14	Travelling	1 mile southwest of Eagle River mouth

Table 3-4 below lists the results of the most recent beluga whale survey conducted by USAG FRA wildlife biologists from June through November 2008. Beluga whales were sighted on 38% of all observation days and the mean number of whales observed during the field season was 13.6 individuals.

Table 3-4. Beluga Whale Sightings In or Near ERF Impact Area in 2008

Date	Number of Belugas	Activity	Location
28 July 2008	12	Milling	Eagle Bay
29 July 2008	15	Travelling	Eagle Bay
30 July 2008	24	Travelling	Eagle Bay
31 July 2008	8	Milling	Eagle Bay
4 August 2008	13	Diving	Eagle Bay
11 August 2008	34	Travelling	Eagle River
12 August 2008	24	Diving	Eagle River
13 August 2008	36	Milling	Eagle River Mouth
18 August 2008	66	Milling	Eagle River

Date	Number of Belugas	Activity	Location
19 August 2008	33	Travelling	Eagle River
20 August 2008	68	Travelling	Eagle River
21 August 2008	4	Travelling	Eagle Bay
29 August 2008	45	Travelling	Eagle River Mouth
1 September 2008	18	Diving	Eagle Bay
7 September 2008	8	Diving	Eagle River
8 September 02008	15	Diving	Eagle River
9 September 2008	18	Milling	Eagle River
10 September 2008	16	Milling	Eagle River
11 September 2008	28	Diving	Eagle River
13 September 2008	17	Milling	Eagle River
15 September 2008	38	Travelling	Eagle River
17 September 02008	12	Travelling	Eagle River
18 September 2008	17	Milling	Eagle River
25 September 2008	28	Travelling	Eagle River Mouth
29 September 2008	8	Travelling	Eagle River
30 September 2008	15	Travelling	Eagle River
8 October 2008	10	Milling	Eagle Bay
9 October 2008	6	Milling	Eagle Bay
28 October 2008	23	Travelling	Eagle River
30 October 2008	21	Travelling	Eagle Bay
6 November 2008	14	Travelling	Eagle Bay
13 November 2008	2	Diving	Eagle River

Figure 3-3 depicts the estimated positions of beluga whales in Eagle Bay and Eagle River during the 21 days during which whales were observed. It should be noted that each point represents the approximate position of a whale or group of whales recorded opportunistically with no data constraints. Positions were taken upon initial sighting and thereafter whenever the animal(s) exhibited a significant change in location or behavior.

Figure 3-4 depicts the estimated positions of beluga whales in Eagle Bay and Eagle River during the 32 days during which whales were observed. It should be noted that each point represents the approximate position of a whale or group of whales recorded per 20 minute sampling rounds.

Figure 3-3. Estimated Positions of Cook Inlet Belugas Observed in Eagle Bay and Eagle River, Spring-Fall, 2007

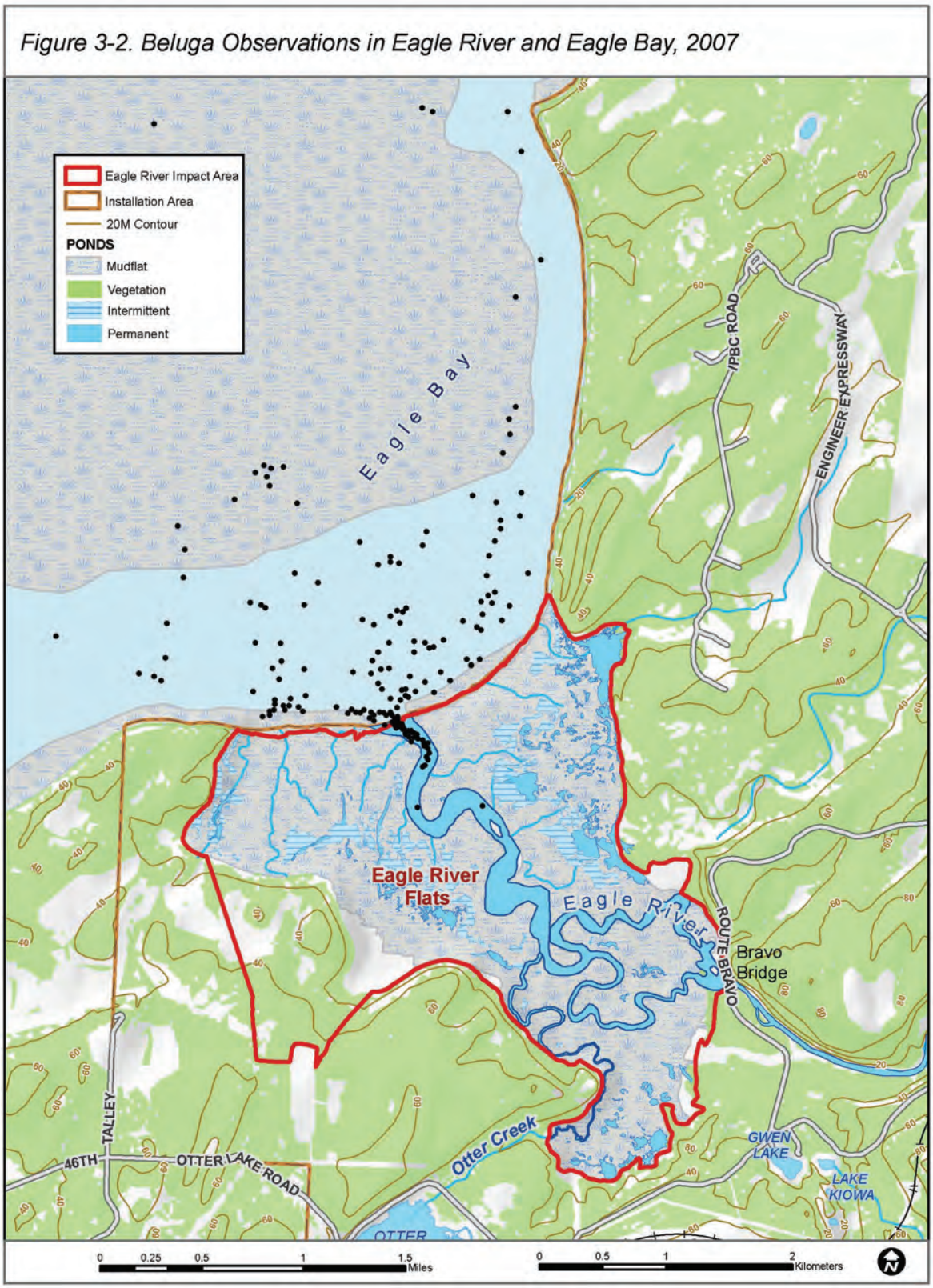
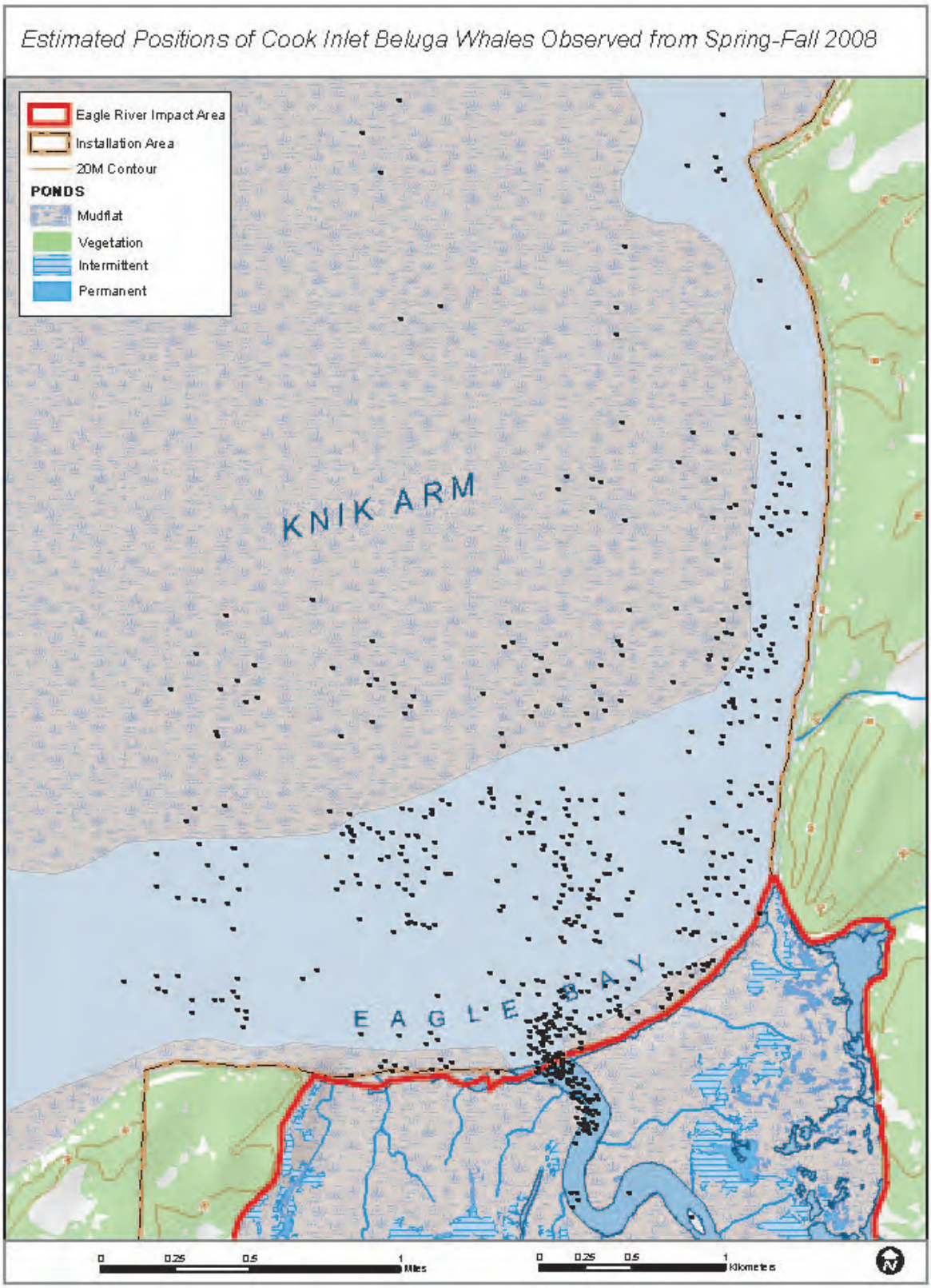


Figure 3-4. Estimated Positions of Cook Inlet Belugas Observed in Eagle Bay and Eagle River, Spring-Fall, 2008



4.0 Environmental Baseline

This section describes the environmental baseline and identifies past and present human-induced factors that have potentially contributed to the current status of the Cook Inlet beluga whale and its habitat within the action area. Much of the information on human-induced factors discussed in this section was taken directly from the Conservation Plan for the Cook Inlet Beluga Whale (NMFS 2008). Additionally, in April 2009 The Port of Anchorage, US Department of Transportation Maritime Administration, and US Army Corps of Engineers Alaska District filed a Biological Assessment of the Beluga Whale in Cook Inlet for the Port of Anchorage Expansion Project and Associated Dredging at the Port of Anchorage, Alaska (POA *et al.* 2009). Due to the proximity of this project to the region of influence for the proposed action, much of the information in the following sections was gleaned from that BA.

The Cook Inlet beluga whale population may be affected by various natural and anthropogenic factors, including subsistence harvest removals, pollution, predation, disease, contamination, fisheries interactions, vessel traffic, small stock size, restricted summer range, and habitat alteration (Norris 1994). While a number of known and potential threats have been identified, there is not enough known about the effect of each specific threat to definitively know the level of impact that each threat has on the Cook Inlet beluga whale (NMFS 2008). In addition, Cook Inlet beluga whales may be affected by multiple threats at any given time, compounding the impacts of the individual threats (NMFS 2008).

The documented decline of the Cook Inlet beluga whale population during the mid-1990s has been attributed to subsistence harvest removals at a level that this small population could not sustain. In response, cooperative efforts between NMFS and subsistence users have dramatically reduced subsistence harvests. These harvest reductions should have allowed the Cook Inlet beluga population to recover if subsistence harvests had been the only factor limiting the population at that time. Abundance data collected during the past several years, however, show that the population is not recovering as expected with the regulation of subsistence harvest.

In the early 1990s, environmental concerns associated with WP led to restrictions on live-fire activities at ERF Impact Area. These restrictions have been in place continuously since that time. Thus, during the anticipated Cook Inlet beluga whale recovery time discussed above, no indirect live-fire training occurred at ERF Impact Area during the unfrozen months when belugas would be present. Consequently, at the times of the year when belugas frequent the project area, training on Fort Richardson has not been a factor in the lack of population recovery. The fact that year-round live-fire weapons training at ERF has historically occurred at levels greater than those outlined in the proposed action, with no measurable or even circumstantial impact to then-healthy Cook Inlet beluga whale populations, further illustrates further supports this conclusion. At this time it is unknown what specific factor, or combination of factors, continues to limit this population's growth.

It should be noted that, as with many major industrial or military sites, contaminants have been unintentionally released to the environment at various portions of Fort Richardson. Contamination on Fort Richardson has included releases of petroleum products, chlorinated solvents, and white phosphorus. None of these contaminants is migrating nor have they affected the status of the Cook Inlet beluga whale (CH2MHill 1998).

4.1 Development

Large numbers of people in a relatively small area are cause for concern regarding the natural environment and Cook Inlet beluga whales. Anchorage is the most populated area of the state, with the 2008 population estimate of the Municipality of Anchorage (MOA) at 279,243 (U.S. Census Bureau 2009). Anchorage is a highly developed city, with a port, airports, highways, and railroads all situated near the coastline. This development has resulted in both the loss and alteration of nearshore beluga habitat and changes in habitat quality due to vessel traffic, noise, and pollution. There is concern that increased development may prevent beluga whales from reaching important feeding areas in upper Knik Arm. Frequent use of shallow nearshore and estuarine habitats makes beluga whales particularly prone to regular interaction with human activities (Perrin 1999), and are thus likely to be affected by those activities.

The following development projects have occurred within or near the action area.

4.1.1 Port of Anchorage

Operations began at the Port of Anchorage (POA) in 1961 with a single berth. Since 1964, the Port has expanded to a five-berth terminal that moves more than four million tons of material across its docks each year (POA 2009). Construction associated with the current Marine Terminal Development Project (MTR Project) has been ongoing on a seasonal basis since 2006, and has included both in-water and out-of-water activities in four areas of the Port (North Backlands, Barge Berths, South Backlands, and North Extension). Some in-water activities have the potential to incidentally harass beluga whales due to underwater noise disturbance in the area (POA 2009).

Port maintenance dredging has occurred annually since 1965. The current operations and maintenance plan at the Port authorizes the Corps to dredge to -35 feet mean lower low water (MLLW). The footprint dredged at the Port fluctuates annually, varying from 95 acres in 1999 to 117 acres in 2004. Over the last nine years the average size of the dredged footprint has been about 100 acres. The amount of dredging required to maintain the Port varies from year to year, with a maximum of about 2.1 million cubic yards (cy) of material dredged in 2004. Maintenance dredging is conducted by one or more dredges and lasts from mid-May through November, depending on the weather. Two to five barge trips per day transport about 1,500 cy of material from each dredge to the disposal site (USACE 2008).

4.1.2 Alaska Railroad Corporation

Construction for a Road and Rail Extension Project began in 2004 (POA 2004), and was completed in 2006. The purpose of this project was to improve the transportation of goods within the POA and to the Alaska Railroad Corporation (ARRC) intermodal yard, and to also support military deployments. The project involved relocating and extending an existing road within the POA, and constructing three tracks, and an intermodal yard. The Maritime Administration's environmental analysis of this project culminated with a Finding of No Significant Impact (FONSI) on February 4, 2004 (POA 2004). The rail line extends along the coastline south of the POA. This project was a component of the Port of Anchorage Intermodal Expansion Project (PIEP).

4.1.3 Elmendorf Air Force Base

Elmendorf Air Force Base (EAFB) began operations in 1940. EAFB maintains and operates a runway near and airspace directly over Knik Arm. Aircraft noise can be loud within the action area. Cargo is routinely transported between the POA and EAFB, including the off-loading of jet fuel for the Base.

4.1.4 Port MacKenzie

Port MacKenzie development began in 2000 with the construction of a barge dock. The first shipments arrived in July 2001. Additional construction has occurred since then and Port MacKenzie currently consists of a 500-foot bulkhead barge dock, a 1,200-foot deep-draft dock with a conveyor system, a landing ramp, and over 8,000 acres of adjacent uplands.

4.2 Vessel Traffic

Vessels traveling in Knik Arm and Cook Inlet can be a threat to beluga whales. The potential for ship strikes exists whenever ships and belugas are in the area at the same time. While ship strikes have not been definitively confirmed in a Cook Inlet beluga whale death, in October 2007 a dead whale washed ashore with "wide, blunt trauma along the right side of the thorax" (NMFS 2008), suggesting a ship strike was the cause of the injury. Vessel traffic can also produce noise disturbance to beluga whales and pollution from the vessels may decrease the quality of their habitat.

There are eight port facilities located in Cook Inlet. Commercial shipping occurs year round, with containerships transiting between the Seattle/Puget Sound areas and Anchorage. Other commercial shipping includes bulk cargo freighters and tankers. Currently, with the exception of the Fire Island Shoals and the POA, no other large-vessel routes or port facilities in Cook Inlet occur in high value beluga whale habitat. Various commercial fishing vessels operate throughout Cook Inlet. Sport fishing and recreational vessels travel between Anchorage and several popular fishing streams that enter the upper Inlet. Several small boat launches exist along the shores of upper Cook Inlet and the Knik Arm, including a float system for small watercraft near Ship Creek, maintained by the MOA.

Due to their slower speed and straight-line movement, ship strikes from large vessels are not believed to pose a significant threat to Cook Inlet beluga whales. Beluga whales are regularly sighted in and around the POA (Rugh *et al.* 2005) passing near or under vessels (Blackwell and Greene 2002), indicating that these animals may have a high tolerance of large vessel traffic. However, smaller boats that travel at high speed and change direction often present a greater threat. In Cook Inlet, the concentration of beluga whales near river mouths predisposes them to strikes by high speed watercraft associated with sport fishing and general recreation. High-speed vessels operating in these whale concentration areas have an increased probability of striking a whale, as evidenced by observations of Cook Inlet belugas with propeller scars (Burek 1999). Small boats and jet skis, which are becoming more abundant in Cook Inlet and the Knik Arm, are also more likely to approach and disturb any whales that are observed.

4.3 Noise

Beluga whales use sound rather than sight for many important functions. They are often found in turbid waters in northern latitudes where darkness extends over many months. Beluga whales use sound to communicate, locate prey, and navigate, and may make different sounds in response to different stimuli. Beluga whales produce high frequency sounds that they use as a type of sonar for finding and pursuing prey, and likely for navigating through ice-laden waters.

In Cook Inlet, beluga whales must compete acoustically with natural and anthropogenic sounds. Human-induced noises include large and small vessels, aircraft, pile driving, shore based activities, dredging, filling, and other events. The effects of human-caused noise on beluga whales and associated increased background noises may be similar to our reduced visibilities when confronted with heavy fog or darkness. These effects depend on several factors including the intensity, frequency, and duration of the noise, the location and behavior of the whale, and the nature of the acoustic environment. High frequency noise diminishes more rapidly than low frequency noises. Sound also dissipates more rapidly in shallow waters and over soft bottoms (sand and mud). Much of

upper Cook Inlet is characterized by its shallow depth, sand/mud bottoms, and high background noise from currents and glacial silt (Blackwell and Greene 2002), thereby making it a poor environment for propagating acoustics.

The ERF Impact Area at Fort Richardson has been used for weapons training since the 1940s, and supported heavy year-round use until February 1990 when USARAK voluntarily implemented a temporary firing suspension. In fact, training often occurred at far heavier levels than those proposed here. Training has not occurred during the times of the year when belugas are observed in the affected area since 1990. In December 1991, live-fire weapons training within ERF Impact Area was resumed, restricted to winter months only, when specified ice conditions are met.

Several notable studies may offer insight on the effect of ship and aircraft noise on Cook Inlet beluga whales. A 2001 acoustic research program within upper Cook Inlet identified underwater noise levels (broadband) as high as 149 dB re: 1 µPa (Blackwell and Greene 2002). That noise was associated with a tug boat that was docking a barge. Ship and tug noise have been present at the POA for several decades and are expected to continue into the future.

Cook Inlet also experiences significant levels of aircraft traffic from the Ted Stevens Anchorage International Airport, EAFB, and several smaller runways. Even though sound is attenuated by the water surface, Blackwell and Greene (2002) found aircraft noise can be loud underwater when jet aircraft are directly overhead. Richardson (1995) discovered that beluga whales in the Beaufort Sea will dive or swim away when low-flying (<500 m) aircraft passed directly over them. However, beluga survey aircraft flying at approximately 244 meters in Cook Inlet observed little or no change in beluga swim directions (Rugh *et al.* 2000). This is likely because belugas in Cook Inlet have habituated to routine small aircraft overflights. Belugas may be less sensitive to aircraft noise than vessel noise, but individual responses may be highly variable and depend on previous experiences, beluga activity at the time of the noise, and characteristics of the noise.

4.4 Water Quality and Pollution

The waters of Knik Arm are brackish, with salinities ranging from 4 to 6 practical salinity units (PSU, equivalent to grams of dissolved solids per kg of seawater) north of Cairn Point. Water temperatures range from freezing (about 31°F) to 63°F or more (in surface pockets observed during the summer months). Measurements of suspended sediment also vary. Several locations near the river mouths exhibit concentrations of up to 1,000 milligrams of sediment per liter (mg/L) between water surface and depths of 15 feet while sediment concentrations at greater water depths have measured more than 4,000 mg/L (Smith *et al.* 2005). The average natural turbidity of Upper Cook Inlet and Knik Arm typically ranges from 400 to 600 nephelometric turbidity units (NTUs). The turbulent nature of the system mixes the water and maintains relatively high dissolved oxygen concentrations throughout the entire water column.

At the mouths of the streams and rivers that flow into Knik Arm, fresh water interacts with the sea water to create an identifiable zone. Since the sea water is denser, the fresh water floats on top until it is mixed by tides and currents, creating a freshwater lens that is sometimes less turbid than the sea water. The lenses extend relatively short distances from the river mouths in the direction of the current and may provide important fish habitat.

The principal sources of pollution in the marine environment are: 1) discharges from industrial activities not entering municipal treatment systems; 2) discharges from municipal wastewater treatment systems; 3) runoff from urban, mining, and agricultural areas; and 4) accidental spills or discharges of petroleum and other products (Moore *et al.* 2000). Contaminants released into the

beluga whales' habitat can affect their overall health (Becker *et al.* 2000). Cook Inlet beluga whales appear to have lower levels of contaminants stored in their bodies than do other populations of belugas; however, the impacts of contaminants on belugas in Cook Inlet are unknown (NMFS 2008). Becker *et al.* (2000) concluded that little is known about the role of multiple stressors in animal health and that future research should examine their interaction and effects on population recruitment in declining populations such as the Cook Inlet beluga whale.

Sediment and surface water samples have been collected from various locations within ERF Impact Area since 1989. Samples have been analyzed for volatile organic, semi-volatile organic, PCBs, and inorganic compounds (metals and other). Trace amounts of several organic compounds have been detected in sediment but not at concentrations that are deemed harmful to humans or wildlife. None of the water samples have contained elevated levels of any contaminants, including munitions constituents. The wetland environment of the ERF Impact Area functions as a uniquely effective mechanism for water treatment, and repeated testing indicates that munitions constituents are neither accumulating in nor migrating off the wetlands.

Eagle River and Ship Creek are the two significant streams flowing into Knik Arm in or near the project area. Eagle River is a glacial waterway that originates at the base of Eagle Glacier in the Chugach Mountains, approximately 26 miles east of Anchorage. Eagle River meanders across Fort Richardson, flowing over an alluvial base of glacial outwash. Eagle River Flats is located at the mouth of Eagle River where it flows into the Knik Arm of Cook Inlet. Total maximum daily loads (TMDLs) for copper, lead, silver, ammonia and chlorine were developed for the Eagle River in conjunction with the National Pollutant Discharge Elimination System (NPDES) permit for the Municipality of Anchorage Eagle River Wastewater Treatment Facility.

Ship Creek is a non-glacial stream originating at Ship Lake in the Chugach Mountains and flowing about 25 miles into the Knik Arm. The stream is diverted by a water supply diversion dam located at the base of the Chugach Mountains on Fort Richardson, approximately 10 miles from the mouth of the stream. Water is diverted for Fort Richardson, EAFB, and the MOA. Ship Creek flows through Fort Richardson, EAFB, and Anchorage before it discharges into Cook Inlet about a mile south of the POA. The lower portion of Ship Creek, from the Glenn Highway Bridge to the mouth, is identified as a Clean Water Act (CWA) Section 303(d) impaired water body (ADEC 2008).

Storm water runoff has the potential to carry numerous pollutants from the MOA into Cook Inlet. Runoff can include pollution coming from streets, construction and industrial areas, and airports. Deicing and anti-icing chemicals may be used on aircraft, tarmacs, and runways at the five airports in Anchorage, including EAFB. The effect of storm water runoff and airport deicer on beluga whales has not been studied and is unknown.

Runoff can also carry hazardous materials from spills and contaminated sites into Cook Inlet. The effect of these pollutants on beluga whales is unknown. Numerous releases of petroleum hydrocarbons have been documented at the POA, EAFB, and the ARRC yard. The POA transfers and stores POLs, as well as other hazardous materials. Significant spills and leaks that have occurred at the Port since 1992 are reported in the 2004 POA SWPPP. Past spills have been documented at each of the bulk fuel facilities within the Port, and also on EAFB's property (POA 2003a and POA 2003b). EAFB is listed on the National Priorities List because of its known or threatened releases of hazardous substances, pollutants, or contaminants. The former Knik Bluff Landfill, located along the coastline near the action area, is one of EAFB's contaminated sites. Landfill debris has eroded onto the beach and both soil and groundwater contaminants have been detected. Cleanup at this site has been ongoing since 1997 (USDOTMA 2005). Spills have also been reported at the ARRC rail yard. In 1986, petroleum seeped into Ship Creek from the nearby rail yard, and several oil spills occurred in